DOCUMENT RESUME

ED 137 092 SE 022 232

AUTHOR Steiner, Robert L.
TITLE Cognitive Dissonance as a Means of Effecting Changes in School Related Attitudes.
PUB DATE Mar 77
NOTE 15p.; Paper presented at the annual meeting of the National Association for Research in Science Teaching (50th, Cincinnati, Ohio, March 22-24, 1977).

EDRS PRICE MF-$0.83 HC-$1.67 Plus Postage.
DESCRIPTORS *Affective Behavior; *Attitudes; Behavior Change; Behavior Theories; Educational Research; *Instruction; *Secondary Education; Secondary School Science; *Student Attitudes; *Student Behavior
IDENTIFIERS Cognitive Dissonance; Research Reports

ABSTRACT

In this study, the cognitive dissonance theory (Aronson, 1972) was applied in an attempt to produce an attitude change by dissonance reduction; that is, to induce a student to behave in a manner contrary to his/her held attitude, thus becoming aware of the inconsistency in his/her behavior and attitude. The attitude would then change to be in line with the behavior already recorded. To effect attitude change, the treatment in this study consisted of asking ninth grade life science students to prepare videotapes extolling positive virtues of (1) science as a school subject, and (2) the school lunch program. Initial determination of attitudes of 133 students towards the two areas was made by the administration of a Likert-type attitude measure. Twenty students from each of four attitude categories (high science-high food, high science-low food, etc.) were randomly assigned to either the science or lunch treatment. After individual administration of the videotaping treatment, an attitude post-test was administered to all students. Analysis of results revealed a significant treatment effect for the science treatment on science attitude and a non-significant effect on the school lunch criterion. Although results are not completely compatible with the cognitive dissonance theory, future research in areas affecting attitude change in science education is suggested. (CS)

****
* Documents acquired by ERIC include many informal unpublished *
* materials not available from other sources. ERIC makes every effort *
* to obtain the best copy available. Nevertheless, items of marginal *
* reproducibility are often encountered and this affects the quality *
* of the microfiche and hardcopy reproductions ERIC makes available *
* via the ERIC Document Reproduction Service (EDRS). EDRS is not *
* responsible for the quality of the original document. Reproductions *
* supplied by EDRS are the best that can be made from the original. *
****

ED137092

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

Cognitive Dissonance as a Means of Effecting Changes in School Related Attitudes

Robert L. Steiner
Associate Professor
The Ohio State University

A Paper Presented at the 50th Annual Convention of the National Association for Research in Science Teaching, Cincinnati, Ohio, March 1977

SE 022 232

Cognitive Dissonance as a Means of Effecting Changes in School Related Attitudes*

Much science education attitude research has lacked an established theoretical framework. Shrigley (1976) has recommended that theories of attitude change identified and developed by social scientists be used as a basis for attitude studies in science education. The present research which attempted to change some school related attitudes was based on one such theory, that of "Cognitive Dissonance" (Festinger, 1957).

Theory

"Cognitive Dissonance is a state of tension that occurs when an individual simultaneously holds two cognitions (ideas, attitudes, beliefs, opinions) that are psychologically inconsistent (Aronson, 1972, p.92-93)." The dissonance state is unpleasant and the individual experiencing dissonance is motivated to reduce it. One application of cognitive dissonance theory, to produce an attitude change as a means of dissonance reduction, is to induce a subject to behave in a manner contrary to his help attitude. The subject is made aware of the inconsistency in his behavior and his attitude, thus producing dissonance. Since the behavior is already of record, the logical means of dissonance reduction is through an attitude change more in line with the behavior.

In this research, the treatment consisted of students preparing a short video tape extolling positive virtues of either 1) science as a school subject and advocating that peers enroll in science, or 2) the school lunch program and encouraging peers to eat school lunches. The student was told that the tape was to be shown to his peers. Dissonance should be created for any student who has an attitude toward the referent counter to what he was extolling on the video tape. Each video taping session was private wherein the student and researchers

* This research was supported in part by an Ohio State University Small Research Grant

worked in preparing a serious and professional tape reflecting a positive attitude toward the particular referent. During the session the student repeatedly saw and heard himself expressing a positive attitude toward the referent and encouraging a particular course of action for peers. Theory suggests that the degree of dissonance experienced in the subjects will be a function of their initial attitudes and predicts the greatest attitude change for those experiencing the greatest dissonance.

Methodology

Although change in attitude toward science as a school subject was a prime concern to the research, attitude toward school lunch was also assessed and included as a treatment. This was to disguise the purpose of the treatments, to test the theory in another school related context and to use the results of the two cognitive dissonance treatments on the criterion measures as controls for each other.

Dissonance theory suggests that the greater the dissonance an individual experiences, the greater the change the individual will make to reduce the dissonance. In this study the theory would suggest that students with differing attitudes toward science as a school subject and toward school lunches would experience differing amounts of dissonance and hence differing attitude changes. In order to test this the criterion attitude measure consisting of a science as a school subject and a school lunch subscale, was administered as both a pretest and post test. The pretest scores were used to classify students as possessing high (HS) or low (LS) initial attitudes toward science as a school subject and high (HF) or low (LF) attitudes toward school lunches. The median scores for the pretest students were used to classify student as having high or low attitudes toward the particular referents. Students were classified into one of the four possible groups, HSHF, HSLF, LSHF, LSLF depending on their pretest attitude scores.

A pilot study was carried out in order to determine the feasibility of the study several months before the actual study. Students comparable to those to be used in the study were used to improve the criterion attitude measures and to give an estimate of the instrument's reliability The video taping treatment protocol was also tested and subsequently modified from the pilot study.

Sample

One hundred thirty-five ninth grade life science students of a local high school were administered the 35 item Likert-type attitude criterion measure in order to assess their initial attitudes toward science as a school subject and school lunches. Students were dichotomized using the median scores as having either high or low attitudes toward each referent.

The criterion measure was administered to all ninth grade life science students as both a pre and post of the effects of the treatment. One hundred thirty-five students took the pretest and 141 the post test. One hundred twenty-five students took both the pre and post test measure. Two of these subjects' responses were not included in the data analysis because of a large amount of missing data on the criterion measure. The research analysis was therefore based on the 123 students who took both the pre and post treatment criterion measure.

Eighty students, 20 from each of the 4 attitude classifications, were randomly assigned to one of the two treatments, food (FT) or science (ST). The remaining students in the attitude classifications were used as a non treatment group and considered in the study as an additional control in the analysis of the effects of the treatments. Of the 80 students assigned to the two treatments, 40 to the science treatment and 40 to the food treatment, 2 left school during the study and 10 were absent during the treatment time interval. The 10 absent students were present to take the post test criterion measure and were therefore reclassified into the non treatment group and

included in the analysis. The number of students participating in the treatments was 68. Table 1 summarizes the number of subjects participating in the study in the various cells and treatment categories.

Table 1. Numerical Distribution of Subjects

Pretest Classification	Treatment		Post test	
HSHF	NT (17)	(3 abs for post test)	14	
(37)	FT (10)	(1 abs treat & post test)	9	33
	ST (10)		10	
HSLF	NT (9)	(1 data dropped, 1 abs post t, gain 1 FT, 2ST)	10	
(29)	FT (10)	(1 abs treatment)	9	27
	ST (10)	(2 abs treatment)	8	
LSHF	NT (11)	(gain 3 from FT)	14	
(30)	FT (9)*	(3 abs treatment)	6	29
	ST (10)	(1 abs treatment & post test)	9	
LSLF	NT (18)	(1 data dropped, 4 abs post test, gain 4 ST)	17	
(39)	FT (11)*		11	34
	ST (10)	(4 abs treatment)	6	
135		* One student was misclassified as HF instead of LF, discovered at completion of study		123

Treatment

The randomly assigned students were individually administered the appropriate treatment over a ten day period. In an attempt to reduce possible experimeter bias, the treatment administrator did not know what attitude category the student represented. The treatment consisted of the student with the assistance of the treatment administrator preparing a short video tape of the student extolling the positive virtues of science as a school subject (science treatment) or of school lunches (food treatment). During the session the student repeatedly saw and heard himself expressing a positive attitude toward the referent and encouraging a particular course of action for peers. The theory suggests that subjects with

less than positive attitudes toward the referent who were knowingly and voluntarily[1] advocating a position and a course of action contrary to their personal beliefs or attitudes would create a state of dissonance. Students could reduce the dissonance by either not preparing the video tape, or by modifying their attitude toward the referent. In the present study no students refused to prepare the tape.

Each video taping session was private wherein the student and administrator worked in preparing a persuasive video tape reflecting a positive attitude toward the particular referent.

Criterion Measures

The criterion measures were included in a 35 Likert-type item instrument. Five response choices for each item ranging from strong disagreement to strong agreement with the item were assigned numerical values ranging from 0 to 4. The items were keyed with the positive response toward the referent being scored 4.

Twenty items composed the attitude toward science as a school subject subscale criterion measure and 14 items composed the attitude toward school lunches subscale criterion measure. One item was included to assess student attitude toward school. The median score for the science subscale was 48.5, reflecting a slightly positive attitude toward science as a school subject. The median score for the school lunches subscale was 28.5, reflecting a neutral position toward school lunches.

The pilot study administration of the criterion measure indicated a low correlation between the two major subscales suggesting that the subscales were relatively independent measures. A correlation of the pretest subscale scores yielded similar results.

A correlation of the pretest and post test science and school lunch attitude subscales for the non treatment group was carried out to obtain a measure of the

[1]It is important that the dissonance producing behavior be induced from the subject as voluntarily as possible in order for dissonance to be induced.

test-retest reliability of the subscales, The test-retest reliability for the 20 item science as a school subject subscale was 0.85 and for the 14 item school lunch subscale was 0.51. Cronbach alpha reliabilities were also determined for the pretest administration of the criterion measure and was 0.92 for each of the subscales.

Results and Conclusions

A three-way analysis of covariance, using the attitude pretest subscale scores as a covariant was performed to analyze the data for the science and school lunch criterion measures. The results of the ANCOVA for the science as a school subject criterion measure are shown in Tables 2 and 3.

The results shown in Table 2 indicate that the prerequisite of equality of regression in all cells of the analysis of covariance was not violated. The results of the ANCOVA for the science criterion measure (Table 3) indicates a main level effect for the treatment variable. None of the other main level effects or interaction effects approached significance. The pre and post test mean scores and the adjusted post test mean scores for the ANCOVA are given in Table 4.

A pairwise contrast of the adjusted treatment mean scores using the Scheffé method (Glass and Stanley, 1970) indicated that the science and food treatment means differed at the 0.05 level and that the science treatment and non treatment means differed at the 0.10 level. The science treatment was effective in producing a positive shift in attitude toward science as a school subject. The predicted differential effect of the science treatment on subjects with differing attitudes toward science as a school subject was not revealed by the treatment x science attitude interaction.

Table 2. Test of Equality of Regression in all ANCOVA Cells: Science Criterion

SOURCE	SS	df	MSS	F	P less than
Regression	559.2	11	50.8	0.8	0.6
Within	5999.8	99	60.6		

Table 3. Analysis of Covariance: Science Criterion

SOURCE	SS	df	MSS	F	P less than
Treatment (T)	542.7	2	271.4	4.6	0.01
Sci Attitude (S)	70.9	1	70.9	1.2	0.28
Lunch Attitude (F)	114.9	1	114.9	1.9	0.17
T x S	24.1	2	12.1	0.2	0.82
T x F	189.4	2	94.7	1.6	0.21
S x F	0.2	1	0.2	0.0	0.95
T x F x S	51.5	2	25.7	0.4	0.65
Regression	7646.4	1	7646.4	128.2	0.00
Within	6559.0	110	59.6		

Table 4. Means for Pre and Post Tests and Adjusted Post Test for ANCOVA: Science Criterion

	Class	Number	Pretest Mean	Post Test Mean	Adj Post Test Mean
Treatment (T)	NT	55	46.0	46.1	46.8
	FT	35	47.2	45.4	45.0
	ST	33	47.5	51.2	50.5
Sci Att (S)	HS	60	57.7	58.6	48.6
	LS	63	36.4	36.5	46.0
Lunch Att (F)	HF	62	47.8	47.6	46.6
	LF	61	45.7	47.0	47.9
T x S	NTHS	24	57.0	58.0	48.6
	FTHS	18	57.4	55.4	45.6
	STHS	18	58.7	62.6	51.6
	NTLS	31	37.5	36.8	45.3
	FTLS	17	36.4	34.8	44.4
	STLS	15	34.1	37.5	49.6
T x F	NTHF	28	47.3	46.4	45.9
	FTHF	15	46.1	41.5	42.1
	STHF	19	49.9	54.1	51.2
	HTLF	27	44.7	45.7	47.6
	FTLF	20	48.1	48.3	47.1
	STLF	14	44.4	47.4	49.6
S x F	HSHF	33	59.0	59.0	47.8
	HSLF	29	52.2	54.1	49.6
	LSHF	27	37.6	37.1	45.3
	LSLF	34	37.5	38.1	46.6
T X S x F	NTHSHF	14	57.9	58.3	48.0
	NTHSLF	10	55.7	57.7	49.5
	NTLSHF	14	36.6	34.5	43.9
	NTLSLF	17	38.2	38.7	46.5
	FTHSHF	9	57.0	52.8	43.4
	FTHSLF	9	57.9	58.0	47.8
	FTLSHF	6	29.7	24.7	40.4
	FTLSLF	11	40.0	40.4	46.6
	STHSHF	10	62.2	65.7	51.5
	STHSLF	8	54.4	58.8	51.8
	STLSHF	9	36.2	41.2	50.9
	STLSLF	6	31.0	32.2	46.7

The results of the analysis of covariance for the attitude toward school lunch criterion are shown in Tables 5 and 6. The results shown in Table 5 indicate that the prerequisite of equality of regression in all cells of the analysis of covariance was not violated. The ANCOVA results (Table 6) for the school lunch criterion indicated a main level treatment effect at the 0.08 level. The mean values for the pre and post tests and the adjusted post test are given in Table 7. An examination of the pre and post test scores indicates shifts consistent with the treatments. A pairwise contrast of the adjusted treatment means using the Scheffé method indicated that the non treatment and food treatment means differed at the 0.10 level, the food treatment being more effective than non treatment in effecting positive shifts in attitudes toward school lunches.

The ANCOVA table indicates a main level effect for science attitude at the 0.02 level. The means in Table 7 indicate that students with more positive attitudes toward science as a school subject had a larger positive change in attitude toward school lunches than did students with less positive attitude toward science as a school subject.

The ANCOVA table indicates a main level effect, significant at the 0.09 level for students with differing initial attitudes toward school lunches. The interaction of the treatment and attitude toward school lunch was significant at the 0.10 level also. The pre and post test scores for the various subgroups indicates shifts predicted by the theory. Both the high attitude and low attitude toward school lunch groups in the food treatment shifted toward a more positive attitude attitude with the lower attitude group undergoing a greater shift.

Table 4. Test of Equality of Regression in all ANCOVA Cells: Lunch Criterion

SOURCE	SS	df	MSS	F	P less than
Regression	569.9	11	51.8	1.0	0.5
Within	5350.6	99	54.0		

Table 5. Analysis of Covariance: Lunch Criterion

SOURCE	SS	df	MSS	F	P less than
Treatment (T)	277.4	2	138.7	2.6	0.08
Sci Attitude (S)	325.2	1	325.2	6.0	0.02
Lunch Attitude (F)	155.2	1	155.2	2.9	0.09
T x S	14.4	2	7.2	0.1	0.88
T x F	258.4	2	129.2	2.4	0.10
S x F	13.3	1	13.3	0.2	0.62
T x F x S	101.1	2	50.5	0.9	0.39
Regression	836.4	1	836.4	15.5	0.00
Within	5920.5	110	53.8		

Table 7. Means for Pre and Post Tests and Adjusted Post Test for ANCOVA: Lunch Criterion

	Class	Number	Pretest Mean	Post Test Mean	Adj Post Test Mean
Treatment (T)	NT	55	27.2	28.0	28.5
	FT	35	26.9	31.4	32.0
	ST	33	31.0	31.6	30.2
Sci Att (S)	HS	60	30.4	32.9	31.8
	LS	63	26.0	27.1	28.2
Lunch Att (F)	HF	62	36.4	35.9	32.0
	LF	61	19.8	27.1	27.9
T x S	NTHS	24	30.0	31.5	30.6
	FTHS	18	28.6	33.6	33.4
	STHS	18	32.8	34.2	32.0
	NTLS	31	25.1	25.4	26.8
	FTLS	17	25.1	29.2	30.6
	STLS	15	28.9	28.5	28.2
T x F	NTHF	28	34.0	32.1	29.4
	FTHF	15	36.4	38.3	34.4
	STHF	19	39.8	39.5	33.9
	NTLF	27	20.3	16.3	27.5
	FTLF	20	19.8	26.3	30.3
	STLF	14	19.1	20.9	35.3
S x F	HSHF	33	37.8	38.0	33.4
	HSLF	29	19.8	24.8	29.9
	LSHF	27	37.3	35.9	30.3
	LSLF	34	18.6	21.8	26.3
T x S x F	NTHSHF	14	35.8	35.3	31.6
	NTHSLF	10	21.8	26.1	29.1
	NTLSHF	14	32.1	29.0	27.1
	NTLSLF	17	19.4	22.4	26.6
	FTHSHF	9	34.9	38.2	35.0
	FTHSLF	9	22.2	28.9	31.7
	FTLSHF	6	38.7	38.5	33.5
	FTLSLF	11	17.7	24.1	29.1
	STHSHF	10	43.3	41.7	34.5
	STHSLF	9	19.6	24.8	28.8
	STLSHF	8	36.0	37.0	33.3
	STLSLF	6	18.3	15.8	20.5

Summary

The cognitive dissonance treatments successfully produced attitude changes in the students' attitudes toward science as a school subject and students' attitudes toward school lunches although in the later case only at the 0.10 level. Differential treatment effects for students with initial high and low referent attitudes as predicted by the theory were not revealed at a significant level. Examination of the unadjusted mean scores suggests a shift in the predicted manner, but statistical analysis of the adjusted post test means did not reveal significant results.

This study represents an attempt to purposely effect a change in school related attitudes using one of the accepted attitude change models from the social science literature. Although the results are not completely compatible with the theory, limited support and further research in areas affecting attitude changes in science education is suggested.

References

Aronson, Elliot. 1972. The Social Animal. New York, Viking.

Festinger, Leon. 1957. A Theory of Cognitive Dissonance. Stanford, Stanford University Press.

Glass, Gene V. and Julian C. Stanley. 1970. Statistical Methods in Education and Psychology. Englewood Cliffs, New Jersey, Prentice Hall.

Shrigley, Robert L. 1976. Generating Theoretical Bases for Attitude Research in Science Education: The Learning Theory Apporach. A Paper Presented at the 49th Annual Meeting of the National Association for Research in Science Teaching. San Francisco, April 1976.